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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,215	06/19/2001	Kyung-Ju Choi	01-4AAF DN 7985	3783
7590 12/05/2003 Polster, Lieder, Woodruff & Lucchesi Suite 160 763 South New Ballas Road St. Louis, MO 63141			EXAMINER FORTUNA, ANA M	
			ART UNIT 1723	PAPER NUMBER

DATE MAILED: 12/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,215

Applicant(s)

CHOI, KYUNG-JU

Examiner

Ana M Fortuna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-22, drawn to a method of forming a media strands or nanofiber by electrospinning, classified in class 210, subclass 508.
 - II. Claims 23-38, drawn to an apparatus for producing media strands or nanofibers, classified in class 239, subclass 294

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to produce strands or fibers of any other materials or polymers, other than hydrophilic polymers, e.g. fluoropolymers, between others.
3. Applicant elected claims 1-38 on paper filed on 8/15/2003. To advance the prosecution of the case group I has been examined.

Claim Rejections - 35 USC § 103

4. Claims 1, 4-12, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dzenis et al (6,265,333 B1)(hereinafter '333), in view of Kellenberger et al

(6,645,407) B2)(hereinafter '407), Hyon et al (4,663,358)(hereinafter '358) and Gvozdic (6,08,117 B1)(hereinafter '117). Reference '333 teaches the process of making nanofibers from PVA by electrospinning process, and collecting the nanofibers on a substrate, the method of making nanofibers by electrospinning is disclosed and recognized prior art (abstract, column 7, lines 45-67, and column 8, lines 1-50). PVA is specifically disclosed in Table 1, column 9, and lines 38). The nanofibers formation onto a surface or a substrate or support by conventional electrospinning,, and further use as composite or in a composite is also disclosed by '333 (column 10, lines 18-46). Reference '333 fails to disclose electrospinning a solution of PVA including crosslinking agents. Reference '407 teaches fiber formation o mixtures of hydrophilic polymer and crosslinking agents, inherently producing a crosslinked fiber (abstract, column 3, lines 23-57, column 4, lines 31-57, column 5, lines 13-34). Reference '407, therefore, suggest the fibrillation of crosslinked hydrohilic polymer solutions by conventional extrusion process. It would have been therefore obvious to one skilled in the art at the time the invention was made to form nanofibers of hydrophilic polymers including crosslinking agents by electrospinning, since electrospinning is a conventional or known extrusion process which has been use for forming nanofiber of hydrophilic compositions; adding the crosslinking agents as expected by the skilled artisan, will generate nanofibers which are water insoluble or crosslinked nanofibers.

As to claims 8, 10, 11-12, reference to Hyon et al ('358) teaches conventional crosslinking agents for hydrophilic polymers (PVA), e.g. aldehydes, formaldehydes, gluyraraldehyde, Borax (column 1, lines 31-51). Regarding claims 6, 9, 11, reference

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'117 teaches crosslinking agents for crosslinking hydrophilic materials, e.g. glycosal, borax, etc (column 2, lines 46-57). It would have been obvious to one skilled in the art at the time the invention was made to use any of the hydrophilic polymer crosslinker agents as suggested in references '358 and '117, for producing a PVA or cellulose crosslinked fiber, by electrospinning process, since fibers are formed by the process independent of its composition, or additional agents added to the fibers composition, and the result is known to those skilled in the art as discussed above, e.g. crosslinked nanofiber.

5. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dzenis et al (6,265,333 B1)(hereinafter '333), in view of Kellenberger et al (6,645,407 B2)(hereinafter '407), Hyon et al (4,663,358)(hereinafter '358) and Gvozdic (6,08,117 B1)(hereinafter '117) as applied to claim 1 above, and further in view of Fujiwara et al (6,472,470 B1) (hereinafter '470). The specific amount of crosslinking agent to polymer (PVA), or the require minimum amount of crosslinking agent to crosslink a hydrophilic polymer is not specifically recited in the references discussed above. Reference '470 teaches crosslinking PVA with aldehyde or equivalents crosslinking agents by adding crosslinking agent in an amount based on 100 parts by weight of the vinyl alcohol polymer, of 5 to 60 parts by weight (column 13, lines 3-26). In the later reference ('470), the composition is used in laminate of crosslinked PVA, however, the crosslinked composition can be used in any other desirable structure, e.g. for making fibers or nanofibers, furthermore, adding between 5 to 60 parts by weight of the agent is expected to crosslink a PVA polymeric aqueous solution.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dzenis et al (6,265,333 B1)(hereinafter '333), in view of Kellenberger et al (6,645,407 B2)(hereinafter '407), Hyon et al (4,663,358)(hereinafter '358), Gvozdic (6,08,117 B1)(hereinafter '117) and Fujiwara et al as applied to claims 1-2 above, and further in view of Vanderhoff et al 96,214,331 B1 (hereinafter '331). The references discussed above fail to disclose the crosslinking in acidic conditions or to specified the pH of the polymer solution. As to claim 5, reference '333 teaches adjusting pH according to the crosslinking agent used, and further discuss the effect of pH on the crosslinking reaction (column 9, lines 24-40), e.g. control the rate of crosslinking, which determine the final properties, , elasticity or rigidity of the product. '331 also teaches increasing of the gelation time with increase in pH, for water soluble polymers (column 19, lines 55-62). It would have been obvious to one skilled in the art at the time the invention was made to use the pH range suggested by the crosslinker manufacturer for a predetermine reaction with a suitable hydrophilic polymer. One skilled in the art at the time the invention was made it would have been motivated to crosslink a high pH for longer gelation time and the production of amore elastic product.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M Fortuna whose telephone number is (703) 308-3857. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on (703) 308-0457. The fax phone

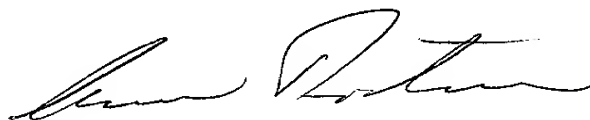
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number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read 'Ana M Fortuna', written in a cursive style.

Ana M Fortuna
Primary Examiner
Art Unit 1723

AMF
December 012, 2003